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# Journal of Emergency Management

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## About the Journal

## The Most Respected Name in Emergency Management

The ***Journal of Emergency Management*** is edited, written, and peer-reviewed by an internationally recognized team of the foremost, hands-on EM experts. They include top professionals from the public and private sectors who offer real-world experience and practical solutions and leading academics who provide perspective and analysis on the latest research and studies. Together, they bring you the most thorough, relevant, and useful source of information on emergency management.

## The Most Important Thing You Can Do for Yourself and Your EM Team

## Published bi-monthly, every issue of the Journal of Emergency Management is peer-reviewed and packed with invaluable information and insight. Topics include:

- Emergency planning and response
- Disaster recovery and business continuity planning
- Emergency preparedness and response legislation
- Risk management
- Emergency management today, tomorrow, and in the future

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- Continuity of operations and infrastructure protection
- Preparation and evacuation for the disabled
- Cross-training in emergency management
- And much more, including a special focus on EM training and higher education

# Current Issue

Vol. 24 No. 4 (2026): July/August

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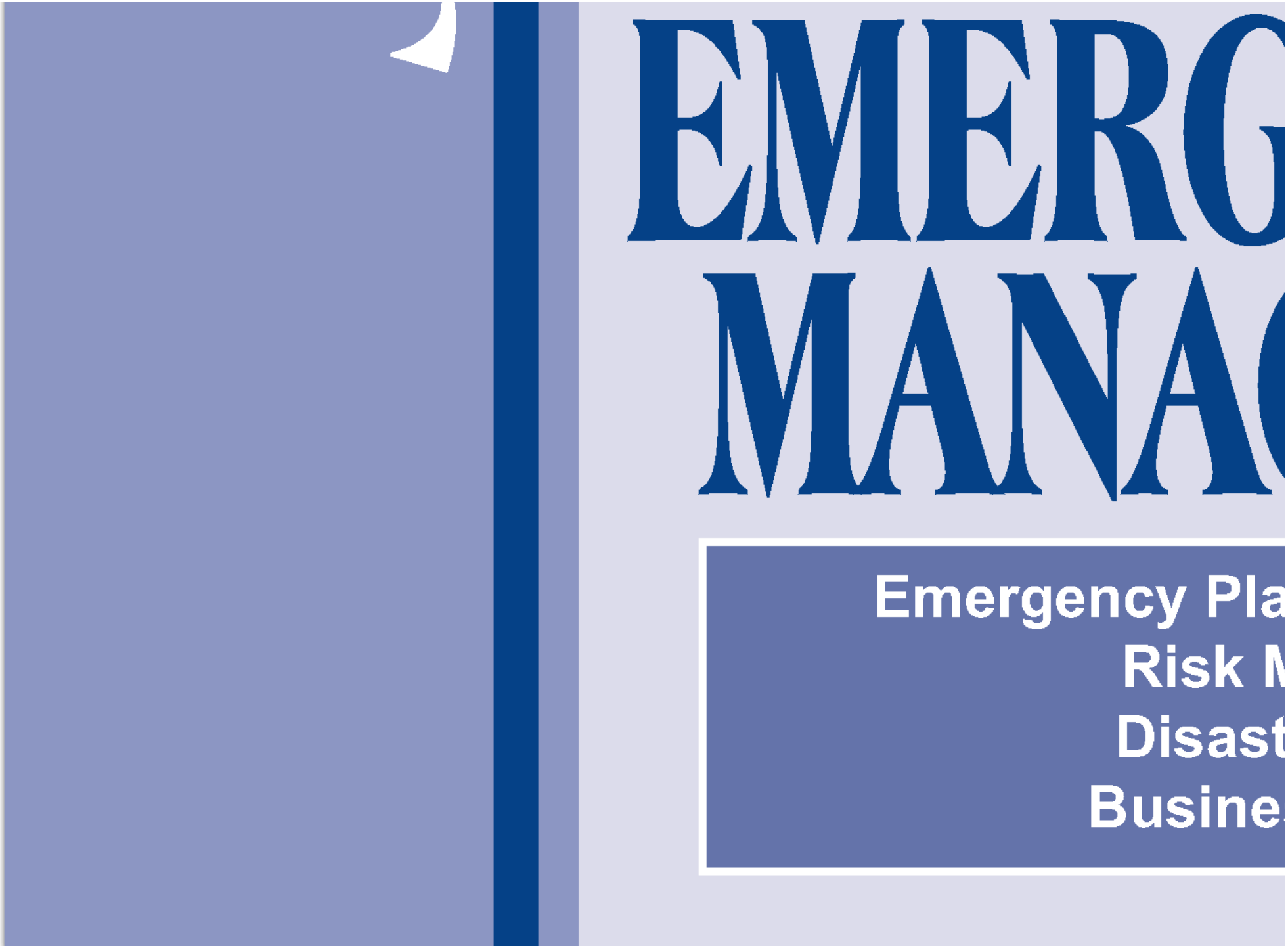

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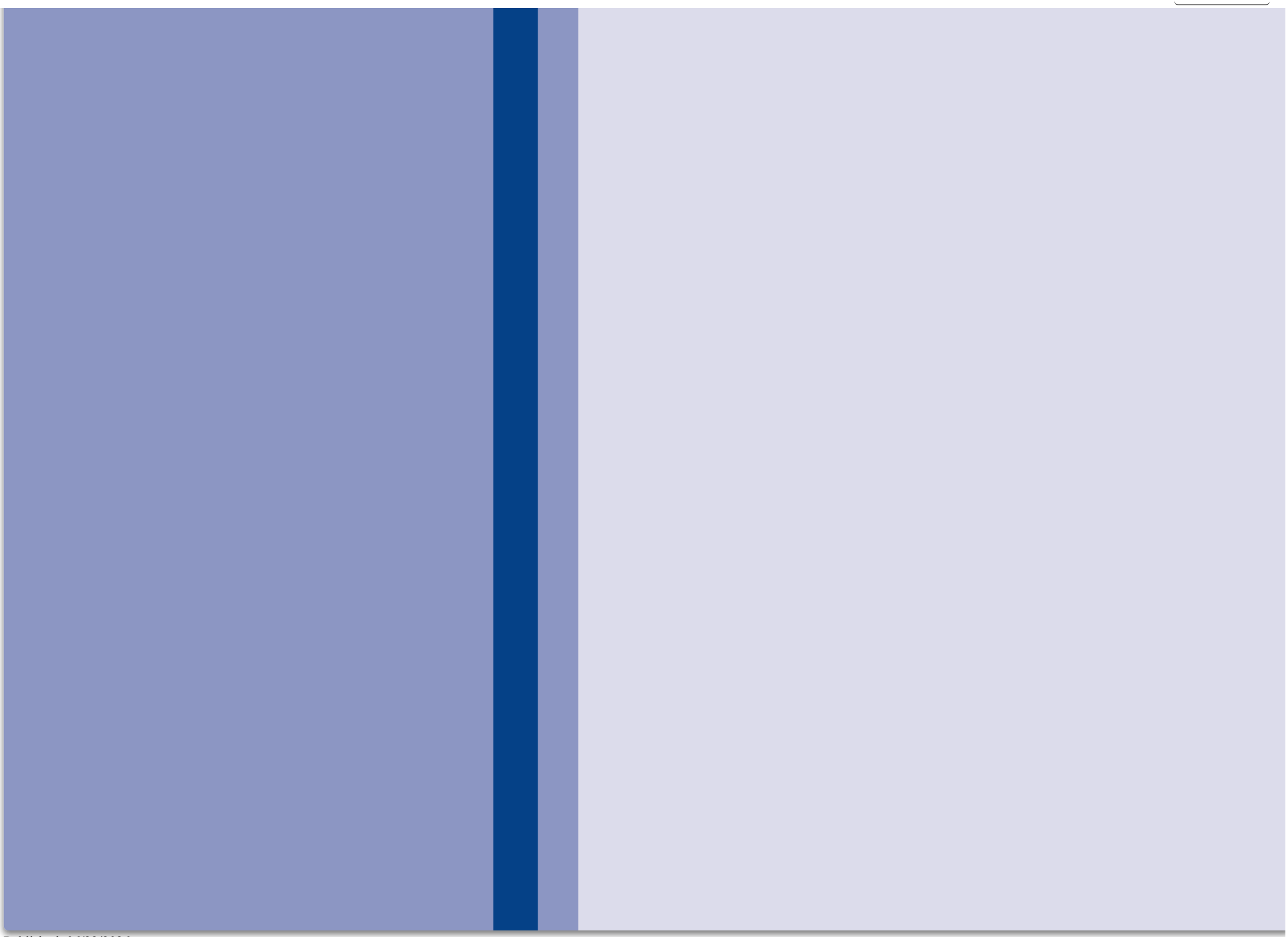

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**Editorials**

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# Editorial

## *Professional burnout in emer*
## *How to support staff and i*

Marcia Deppen

Burnout. Is. Real.

was

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I first experienced burnout during the second year of the COVID-19 global pandemic. It was just after January 2021 when Maryland and the rest of the world were beginning mass vaccination efforts. I was working 16-hour days as the Human Resources (HR) Lead for the Maryland COVID-19 Vaccination effort. Everything I knew about HR I learned by staying at a Holiday Inn last night. . . AKA I was winging it. I was hiring, interviewing, firing, and coordinating contract employees for six mass vaccination sites in Maryland and providing clinical staff to support local jurisdiction vaccination sites. It was a daunting task, especially with clinical contract staff, who were moving from location to location, chasing the big money. I figured the funk I was in was because I was doing work that wasn't within my desired scope, a work depression of sorts. But it turned out to be much more than that.

The Mayo Clinic states that "depression and burnout

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are different and need different treatments. "I was handling this "feeling" like I handled other bouts of depression, and it wasn't working. It was the first time in 21 years that I began to hate my job. I dreaded getting up each morning. Meetings started at 6:00 AM and didn't end until after 8:00 PM. I wasn't sleeping, I was eating crappy food, I was irritable, quick to cry, and in a constant state of frustration. I decided to go back to counseling, which I had abandoned in 2015 because everything was going well for me: Good job, loving husband, great daughter . . .the puzzle pieces had fallen into place and I was happy. I WAS HAPPY. But now I was miserable. It

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# Professional burnout in emergency management: How to support staff and increase retention

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**Articles**

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# *Pediatric mass casualty traini manikins, and avatars in tab and virtual enviro*

Angela M. Bowen, MPS, RN
Mark X. Cicero, MI
Nichole Shimko, MSN, RN, C
Debra L. Weiner, M

## ABSTRACT

trai

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*Mass casualty incidents involving children pose unique challenges that demand specialized training due to children's distinct physiological and psychosocial needs. Despite comprising nearly 25 percent of the United States population, pediatric considerations are often underrepresented in disaster preparedness exercises. Pediatric-specific training improves provider competence, system readiness, and outcomes, aligning with national initiatives such as the Emergency Medical Services for Children Innovation and Improvement Center's National Pediatric Readiness Project. While live drills offer realism, they raise ethical and logistical concerns when involving children. Tabletop, simulation-based, and virtual trainings present safer, scalable alternatives for preparing multidisciplinary teams. This manuscript examines the goals and strategies of pediatric disaster training, including decontamination, triage, evacuation, medical care, and reunification. It also reviews the*

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*ties and tools, ranging from low-tech devices to high-fidelity simulators and immersive virtual platforms, emphasizing the importance of pediatric inclusion in all levels of disaster response planning.*

*Key words: pediatric disaster preparedness, mass casualty incidents, pediatric triage, simulation training, emergency preparedness*

## INTRODUCTION

Mass casualty incidents (MCIs) involving children present unique challenges that require specialized

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# and virtual environments

Angela M. Bowen, MPS, RN, CPEN, NRP IC, Mark X. Cicero, MD, FAAP, Nichole Shimko, MSN, RN, CCRN, CPN, C-NPT, Debra L. Weiner, MD, PhD

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# *Effective alerts and warnings: An e skills, and abilities among publi*

Jeannette Sutton
Micki Olson, P
Hugh Walpole,
Lauren B. Cain,
Zach Stanfor
Savannah Oli
Bruce Pollock,

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## ABSTRACT

*The Message Design Dashboard (MDD) is a software tool designed to guide users through the creation of effective, evidence-based wireless emergency alerts (WEAs). To support its use, our team developed a companion training program to improve public safety communicators' knowledge, skills, and abilities (KSAs) related to warning message design and MDD use. This study evaluates the effectiveness of the MDD training using a pre-, mid-, and post-course design across 14 training sessions involving 245 participants. We assessed perceived and demonstrated KSAs through surveys and scenario-based message writing tasks.*

*Results show statistically significant improvements in participants' confidence to write effective warning messages for both familiar and unfamiliar hazards. Participants also reported strong confidence in their ability to use the MDD following the training.*

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*revealed a marked increase in message completeness, with the average number of key elements included rising from 5.8 at baseline to 7.5 post-training (out of eight possible elements).*

*These findings suggest that the MDD training not only increases public safety communicators' self-efficacy but also enhances their practical ability to write high-quality warning messages. The MDD and its associated self-paced training are publicly accessible, offering a viable and evidence-based solution to improve national alerting capabilities.*

DOI: 10.5055/jem.0951

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**Vol. 24, No. 4, July/August 2026**

**Effective alerts and warnings: An assessment of knowledge, skills, and abilities among public safety**

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# communicators

Jeannette Sutton, PhD, Micki Olson, PhD, Hugh Walpole, PhD, Lauren B. Cain, MA, Zach Stanford, Savannah Olivas, Bruce Pollock, MS

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# *Crisis communication of public*
# *A case study of Hurricane Irma ex*
# *between topics and e*

Tasnuba Binte Jam
Aidan Rogers,
Yue 'Gurt' Ge, I
Samiul Hasan,

## ABSTRACT

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*Social media platforms are increasingly used for information dissemination and communication in disasters. This study analyzes the crisis communication posts of public agencies on Twitter® during Hurricane Irma. Analyzing the relationship between the engagement of a tweet and different factors such as communication topics, features of a tweet, and Twitter account characteristics, the research aims to uncover effective aspects for enhancing public engagement and response during disasters. Using machine learning and statistical models, we analyze the tweets posted by prominent public agencies and local agencies active in the East Central Florida region in response to Hurricane Irma. The number of retweets is used as an engagement metric. Results indicate that posts related to real-time updates on storm prediction, preparedness activity, user concerns, and recovery gain higher engagement. Besides posting frequent tweets by agencies, time of tweeting, an agency's popularity measured*

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*the agencies, eg, federal, or regional, are associated with higher engagement. The study emphasizes the significance of efficient messaging and clear communication in capturing public attention during crises. It provides valuable insights for public and emergency management agencies seeking to improve their crisis-related social media strategies, specifically on Twitter. This study would also enable public agencies to better understand their social media communication strategies by identifying key elements of successful engagement in social media.*

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**Crisis communication of public agencies in Twitter®: A case study of Hurricane Irma exploring the**

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# relationship between topics and engagement

Tasnuba Binte Jamal, PhD, Aidan Rogers, BSc, Yue ‘Gurt’ Ge, PhD, Samiul Hasan, PhD

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# *A cross-disciplinary survey of intelligence techniques and dy for weather warning commun to increase hurricane eva*

Madeleine Gagn
Colin Potts, Pl
Arnav Jhala, F

## ABSTRACT

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*The following survey paper reviews several meth-*
*odologies across the fields of computational meteor-*
*ology, dynamic programming, communications psy-*
*chology, and narrative artificial intelligence that can*
*provide effective messaging solutions to the ongoing*
*problem of low evacuation turnout during emergencies*
*like hurricanes. We focus on two main aspects of emer-*
*gency messaging. First, we focus on dynamic program-*
*ming as a technique to optimize message formats. This*
*technique has been applied to emergency management*
*in the past, as it provides researchers with state-*
*based stochastic models that can lay a framework for*
*developing communication optimization algorithms.*
*Second, communications psychology suggests how*
*the brain is hardwired for greater persuasion and*
*information intake when facts are organized in the*
*format of narratives, suggesting that story structure*
*itself optimizes messaging. We review work in com-*
*putational models of narrative generation for their*

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*messaging. The introduction and synthesis of relevant work from these disciplines and their application to emergency messaging could provide a novel approach for improving evacuation outcomes.*

*Key words: narrative artificial intelligence, state-based stochastic dynamic programming, hurricane evacuation warnings, meteorology decision support, communications optimization, narrative causality, narrative persuasion, choice poetics, digital twin social simulation, computer science, optimization algorithms, operations research, computational narratology*

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**A cross-disciplinary survey of narrative artificial intelligence techniques and dynamic programming for**

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# weather warning communication optimization to increase hurricane evacuation turnout

Madeleine Gagné, MS, Colin Potts, PhD, Arnav Jhala, PhD

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# *Hurricane Irma's lessons: The dis plans and response in Fl*

Ratna B. Dougher
Erika A. Koenige

**ABSTRACT**

*Previous literature has identified that gaps between planned and actual disaster responses can have an impact on effective service delivery by municipalities.*

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*However, few have quantified the differences in agencies across the planning phase and actual response. This work fills that gap by comparing organizations listed in Comprehensive Emergency Management Plans (CEMPs) and after-action reports (AARs) for seven Central Florida counties after Hurricane Irma. Using documentary data analysis and statistical tests, the research explores differences in governance level and sector (government, nonprofit, and private). The results show a statistically significant difference in governance levels between the CEMPs and AARs, indicating that AARs are not reflective of the plans. The study found no statistically significant differences in sector representation. This research highlights a critical disconnect between disaster planning and real-world implementation, particularly regarding the involvement of organizations at different governance levels. These findings offer a new perspective for emergency managers to identify disconnects, refine*

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*for more effective disaster responses.*

*Key words: governance, networks, planning, implementation, documentary data, disasters*

## INTRODUCTION

The purpose of planned policies for disasters is to ensure effective and efficient response, with goals that are utilized and measured for future best practices. As disasters increase in scale and scope, it has become critical for disaster planning and response to evolve accordingly. From an organizational perspective, this

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Ratna B. Dougherty, PhD, Erika A. Koeniger, MPA
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# *Evolutionary disaster recovery: i*
# *ransomware attacks using g*

Eduardo Landaet

**ABSTRACT**

*Organizational resilience faces an increasing worldwide threat from ransomware attacks, which disrupt essential infrastructure and result in major financial and operational damage. The incidents cre-*

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*are extended system outages, which trigger a chain reaction of disruptions throughout supply chains and connected systems. This research develops a genetic algorithm (GA)-based solution to optimize disaster recovery operations after ransomware attacks occur. The model works to achieve three major objectives, which include minimizing recovery time objective (RTO) and restoring vital systems first while optimizing resource distribution within financial limits. The GA uses selection, crossover, and mutation to develop recovery sequences through an iterative process of multiobjective optimization. The simulation analyzed eight enterprise systems, which had different criticality levels and cost and availability characteristics. Simulation results show that the GA-optimized recovery plan performs better than standard and random recovery approaches by cutting down RTO and recovery expenses while enhancing system operational availability. The research demonstrates how evolution-*

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*providing a flexible framework to boost ransomware resistance in advanced digital systems.*

*Key words: ransomware, genetic algorithms, disaster recovery, recovery time objective, cybersecurity risk management*

## INTRODUCTION

Ransomware attacks represent a major global cybersecurity danger that encrypts vital organizational data to force victims into paying ransom fees for system access restoration. The sophisticated nature

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**Evolutionary disaster recovery: Minimizing RTO after ransomware attacks using genetic algorithms**

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Eduardo Landaeta, PhD
529-538

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# *Behind the lines: Decoding Nat*
# *operations for emergen*

Carl Dement, I

**ABSTRACT**

*Disasters, both natural and human-induced, are increasing in frequency and intensity, straining the United States (US) emergency response systems. The National Guard (the Guard) plays a critical role in*

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*disaster response, yet many emergency managers (EMs) struggle to effectively coordinate with it due to a limited understanding of its operations, needs, and request processes. This study bridges this gap by providing EMs with actionable strategies to enhance collaboration with the Guard, drawing on 23 in-depth interviews with senior Guard officers from four states, the National Guard Bureau, and Army North. Using the Disaster Research Center's typology of organized responses, the Guard is analyzed as an "Expanding Organization," revealing how it scales its capabilities for disasters while navigating its dual state-federal mission. Findings uncover new insights, such as the pivotal role of the Director of Military Support, deployment fatigue challenges, and political influences on resource allocation, not fully addressed in existing doctrine. These insights equip EMs to streamline requests, reduce delays, and foster stronger civil-military partnerships, thereby improving disaster pre-*

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*Recommendations emphasize practical steps to bolster the US response and recovery efforts.*

*Key words: National Guard; Civil Military coordination; emergency management; Defense Support of Civil Authority; organizational adaptation*

## INTRODUCTION

In 2022 alone, the United States (US) faced 18 billion-dollar disaster events—hurricanes, wildfires, floods, and severe storms—causing over USD 180 billion in damages and pushing emergency response

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Carl Dement, PhD
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# *Artificial intelligence-driven u emergency management: Deve for crisis response in m*

Goddy Uwa Osime
Oluwakemi Morola F
Felix Chidozie,
Temidayo David Ola

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*This research explores the importance of artificial intelligence (AI) in enhancing crisis response frameworks in modern warfare. It addresses the challenge of effectively managing crises arising from AI-driven weapons systems. The main aim of this study is to develop a comprehensive framework that outlines how AI can be utilized to improve crisis response arising from modern warfare. The study applied a qualitative research method, using selected existing literature relevant to the study, and the data collected were thematically analyzed. The developed framework provides actionable guidelines for military and emergency management (EM) personnel to effectively respond to AI-related challenges, thereby improving operational efficiency. The findings revealed, among others, that integrating AI into crisis response strategies will not only streamline decision-making processes but also enhance the over-*

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*environments. This research contributes to the ongoing discourse on the strategic use of AI in warfare, encouraging future inquiries into optimizing these technologies within military and EM frameworks. Ultimately, the study serves as a foundational resource for developing structured approaches to crisis response involving AI-driven weapons systems in modern conflict scenarios.*

*Key words: artificial intelligence, crisis response, emergency management, Observe, Orient, Decide, and Act loop theory, modern warfare*

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**Artificial intelligence-driven weapons systems and emergency management: Developing a framework**

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# for crisis response in modern warfare

Goddy Uwa Osimen, PhD, Oluwakemi Morola Fulani, MSc, Felix Chidozie, PhD, Temidayo David Oladipo, PhD

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# *Understanding factors influencing GLMs: A case study from the 202*

Pei Pei, PhD, A

**ABSTRACT**

*This paper examines post-disaster grants distributed to households by the Federal Emergency Management Agency (FEMA) following the 2024 Ohio tornadoes. These grants provide essential support for*

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*housing, repairs, and other disaster-related needs, particularly for underinsured individuals. Accurately predicting eligibility is critical to ensuring that aid is allocated in a timely and equitable manner. An interpretable classification model was developed using a generalized linear model to help FEMA decision-makers predict aid eligibility based on household and community-level factors. The analysis also investigates whether socioeconomic and demographic characteristics are associated with aid eligibility, offering insights that can support more transparent and data-informed disaster response policies. The model achieves a high classification performance with an area under the curve of 0.96 on both training and testing data.*

*Key words: classification, data-driven decision-making, generalized linear model*

## INTRODUCTION

*2024 Ohio tornado*

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brief overview of the March 2024 tornado outbreak is provided. This was a major spring tornado event that hit the Midwest and Northeast, with Ohio and Indiana being the most affected.[1] In total, 34 tornadoes were confirmed, and eight of these were classified as strong to intense. Two notable tornadoes were

1. Winchester, Indiana: An EF3 tornado caused severe damage and sadly led to one fatality.

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**Understanding factors influencing FEMA aid eligibility via GLMs: A case study from the 2024 Ohio**

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# tornado response

Pei Pei, PhD, ASA

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